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Name of Principal Author and all other author(s):

MAJ Paul Evangelista, USA; MAJ Melanie Carlson, USA

Principal Author's Organization and address:

Department of Systems Engineering  
Mahan Hall  
USMA  
West Point, NY 10996

Phone: \_845-938-5539

Fax: \_845-938-5919\_

Email: \_paul.evangelista  
@usma.edu\_

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# Budget Modeling Under Uncertainty for the Modular Force Structure

*75<sup>th</sup> Annual MORS Symposium*

**MAJ Paul Evangelista, Ph.D.**  
**MAJ Melanie Carlson**

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# Agenda

- Background
- Problem Statement
- Funding Analysis
- Model Approach
- Inputs and Uncertainties
- Progress on Model Development
- Future Work



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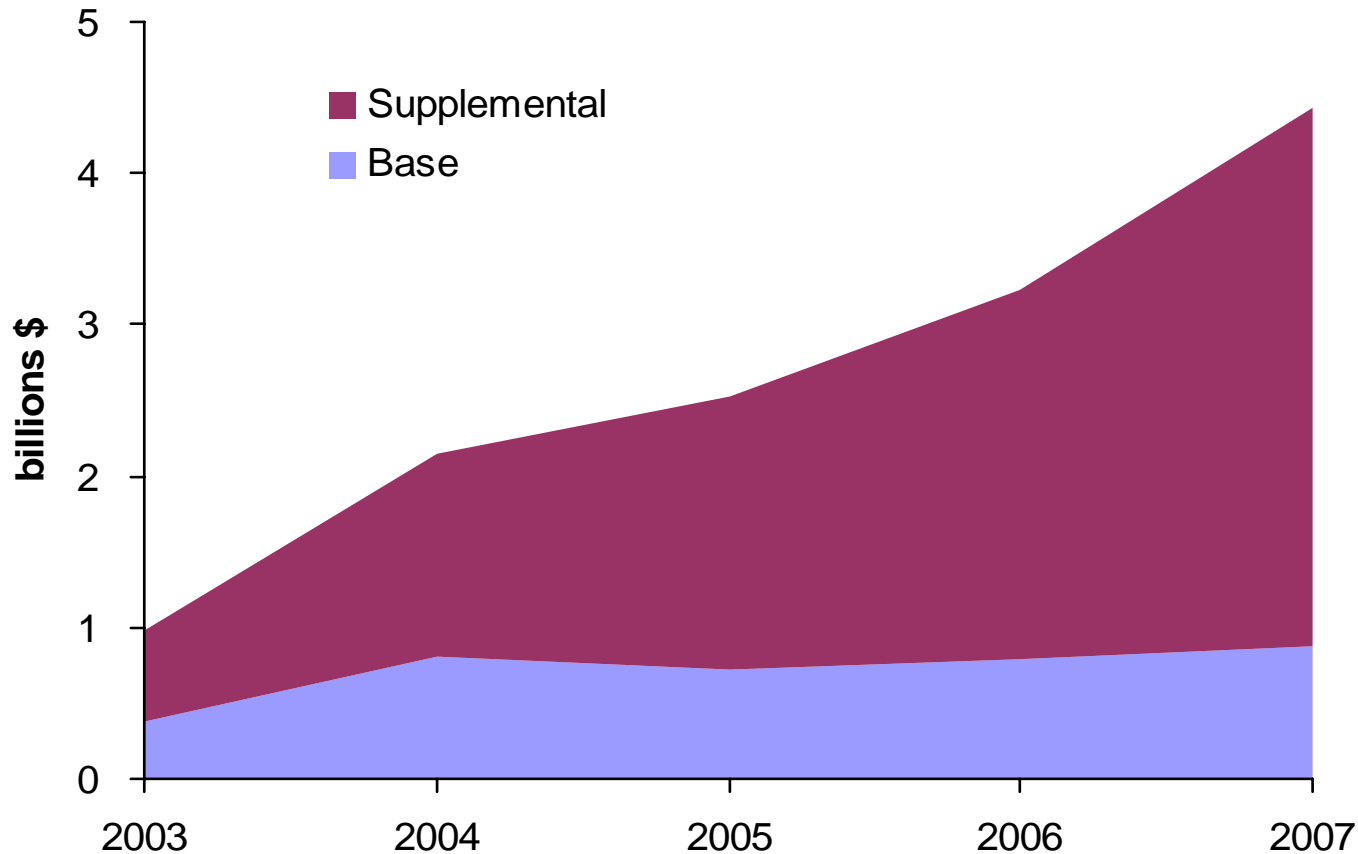
# Project Impetus

- Since the start of the GWOT, DoD has relied on substantial and regular supplemental funds
- Program Executive Office (PEO) Soldier provides material solutions for Soldier equipment requirements
- 80% of the current PEO Soldier budget consists of supplemental funds
  - ❑ What message does that send?



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# PEO Soldier Budget



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# Objectives

- Identify and analyze the *impact of supplemental* funding on the PEO Soldier budget and mission
- Develop a Capabilities Based Budget Forecasting Model for PEO Soldier
  - Life after the supplemental funding surge
  - Focus on the ***delivery of capabilities***



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# Background

- Purpose of PEO Soldier:

- ❑ “to develop the best equipment and field it as quickly as possible so that our Soldiers remain second to none in missions that span the full spectrum of military operations”

- Sample of Programs

- ❑ Rapid Fielding Initiative
  - ❑ Body Armor
  - ❑ Sensors and Lasers
  - ❑ Weapons Modularity / Modernization
  - ❑ Army Combat Uniform



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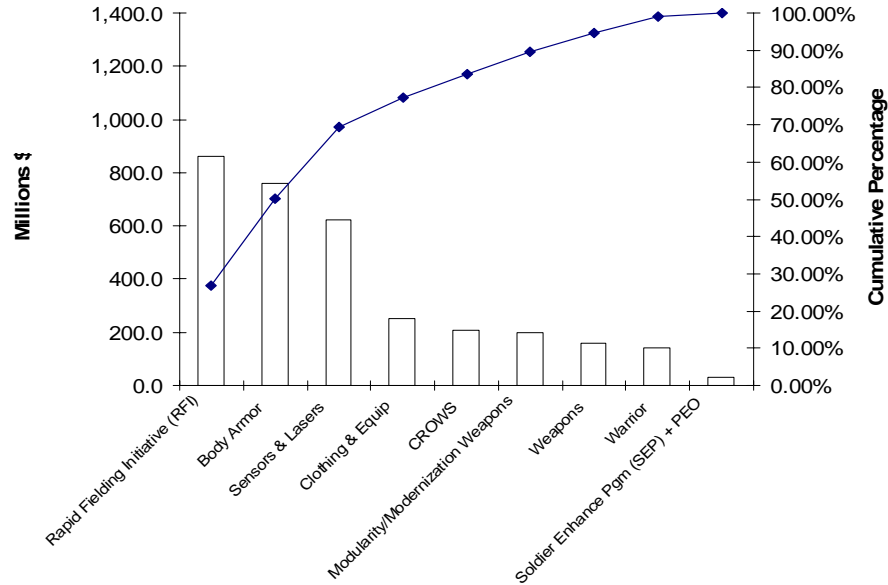
# Problem Statement

- ❑ PEO Soldier accurately predicts programming (FY10-15) requirements that support the needs of the Soldier for the future Army force structure
- ❑ PEO Soldier seeks analysis of supplemental vs. programmed funding
- ❑ Budget management directorate seeks a predictive model to support the building of the program objective memorandum (POM)

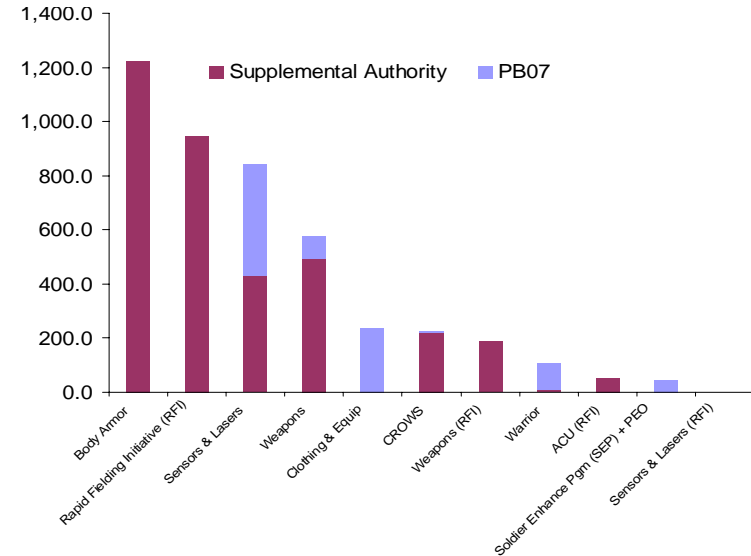
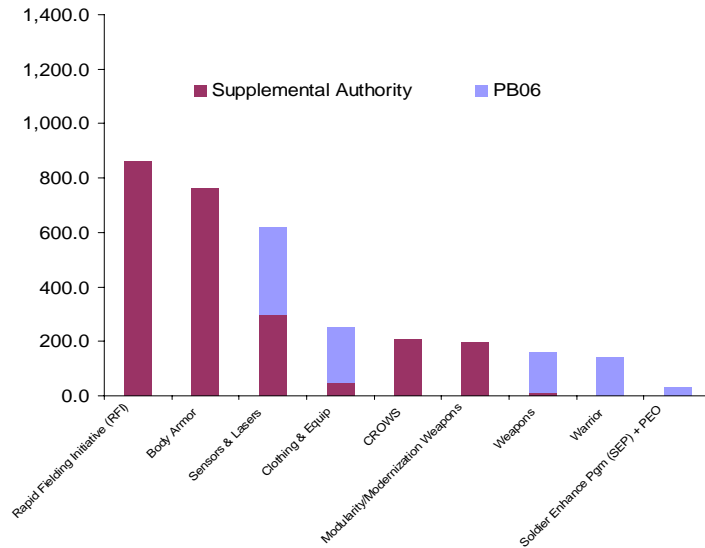
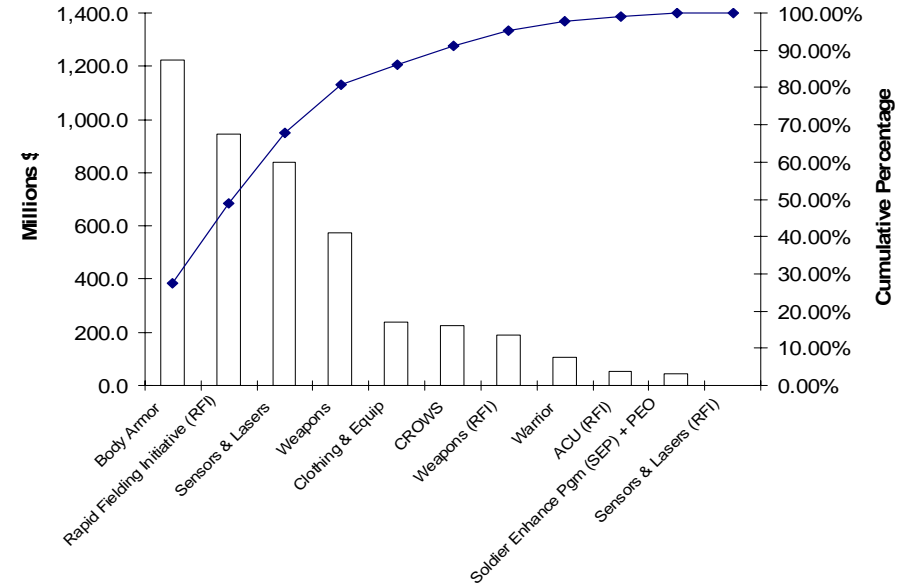


# Impact of Supplemental Funds

FY2006 PEO Soldier Budget Execution(\$3.2B)



FY2007 PEO Soldier Budget Execution(\$4.4B)



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# Analysis of Supplemental Funds

- Supplemental funds have enabled extraordinary and rapid progress on several PEO Soldier initiatives
  - ❑ RFI, ACU, GC Helmet, weapons advances
- Why aren't equipment advances programmed and anticipated?
  - ❑ Direct impact on Soldier readiness
  - ❑ Readiness is arguably a national and DoD priority that deserves sustained and predictable funding
  - ❑ Inadequate or misallocated efforts prior to the onset of GWOT made cost-intensive rapid development and fielding efforts necessary



# Risk Relationship

## Funding Strategy

		Programmed Funds	Supplemental Funds
<b><u>Problem Class</u></b>	Structured Problems	Low Risk	Medium Risk
	Unstructured Problems	Medium Risk	High Risk

Risk = Exposing the force to degraded readiness of the associated system, resource, or capability



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# Supplemental Detox

- Supplemental funding, which has fueled recent PEO Soldier successes, is expected to substantially decrease
- Given the current funding scheme, PEO Soldier may be less effective in its mission to provide capability to the force without supplemental funds
- Road forward for budgets sans supplementals
  - Capabilities Based Budget Forecasting



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# Capabilities Based Budget Forecasting

- Data driven strategy to influence budget decisions
  - What is the impact in terms of **capabilities** of funding decisions
  - Support for POM development for the long term assuming a significant decline supplemental funding
- What capabilities will the force need?
- How much will that cost?
- What are the uncertainties in that information?



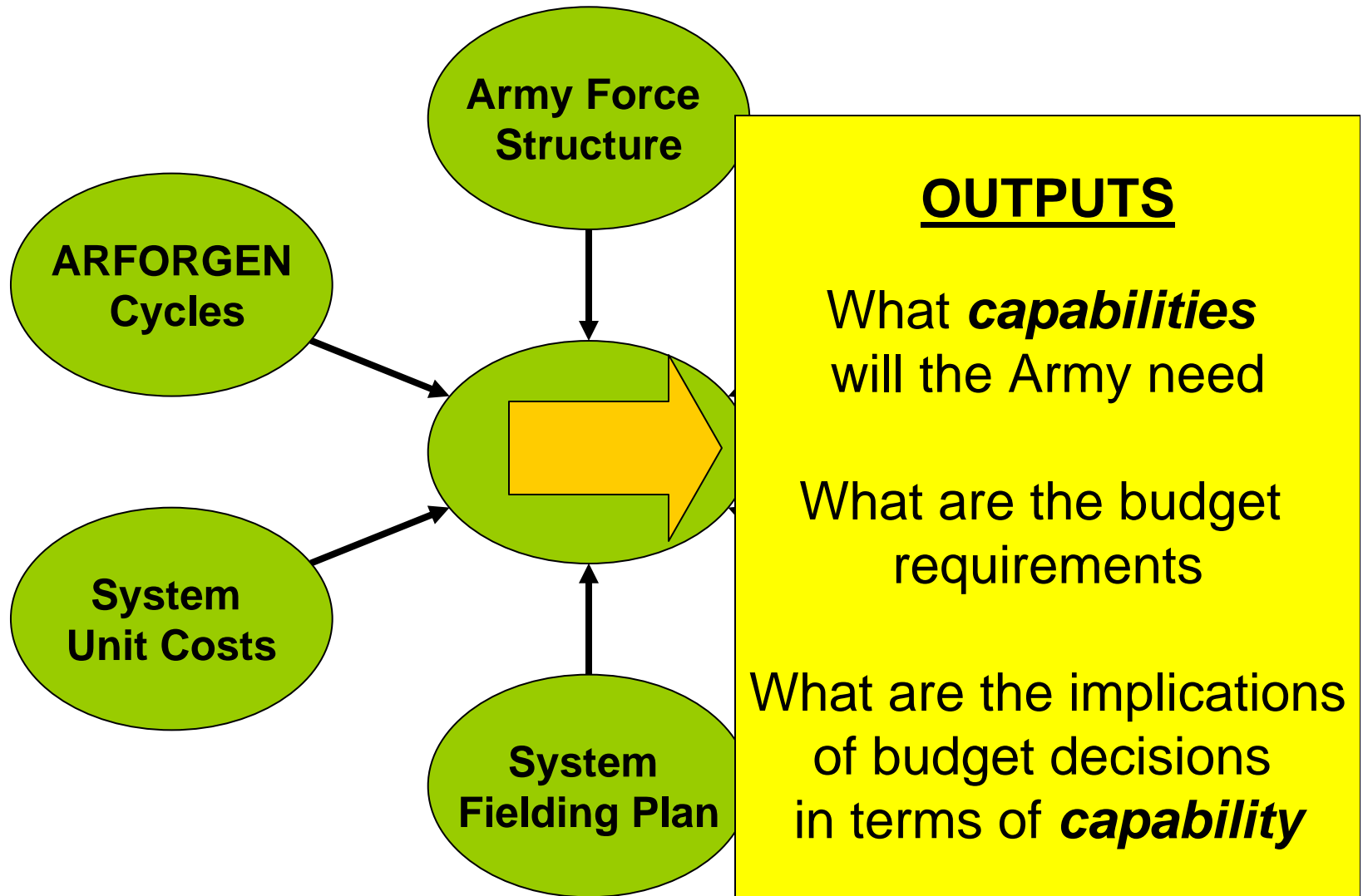
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# Driving Factors

- Unit Costs and Brigade Sets for Systems
  - ❑ Quantification of Unfunded Requests in terms of BCTs
- ARFORGEN and Deployment Rates
  - ❑ Requirements in Reset Phase
- Growth of the Army
- Asset Visibility Model
  - ❑ Condition of the equipment fleet
  - ❑ Consumption rates



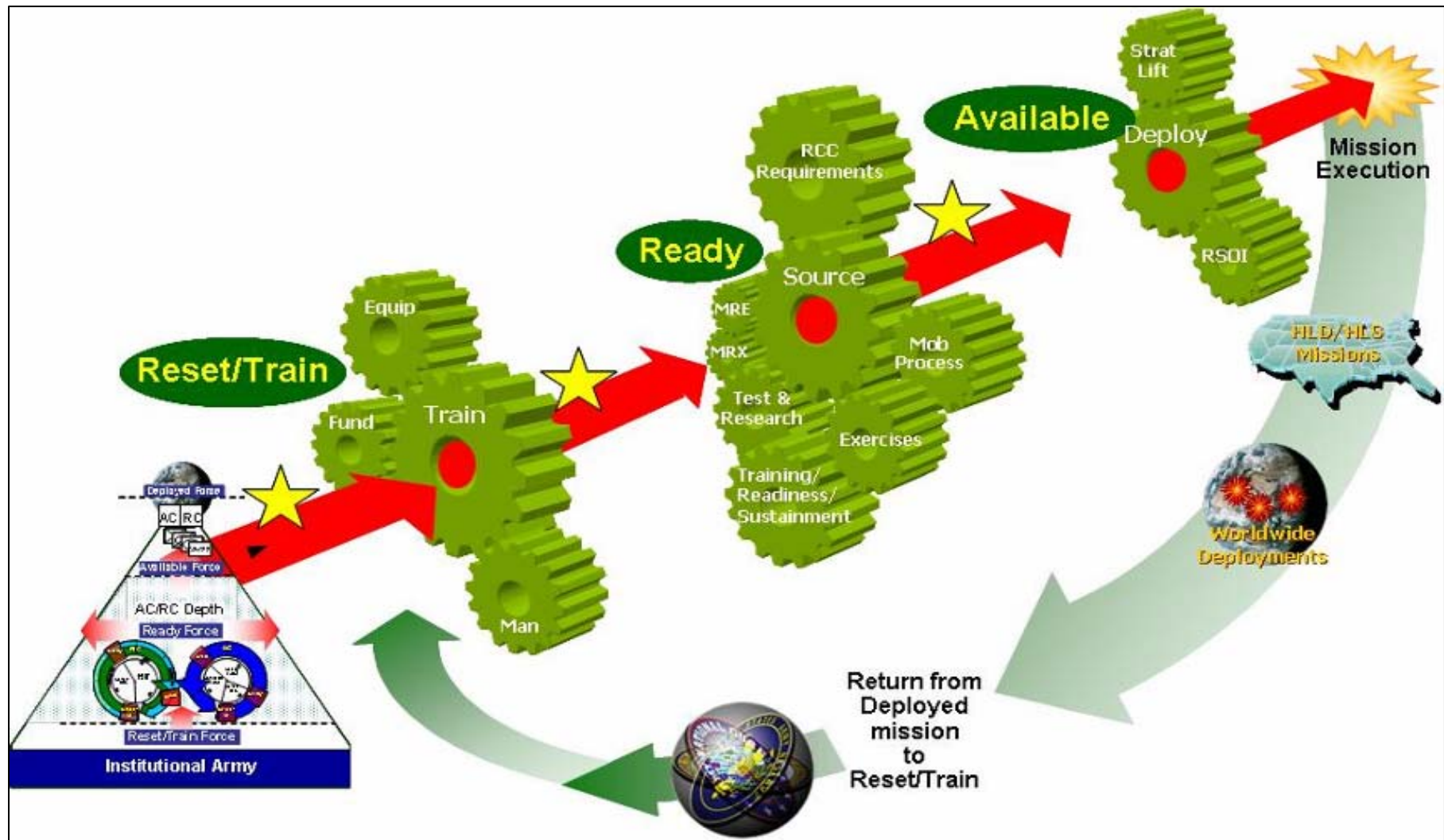
# Capabilities Based Budget Forecasting Model



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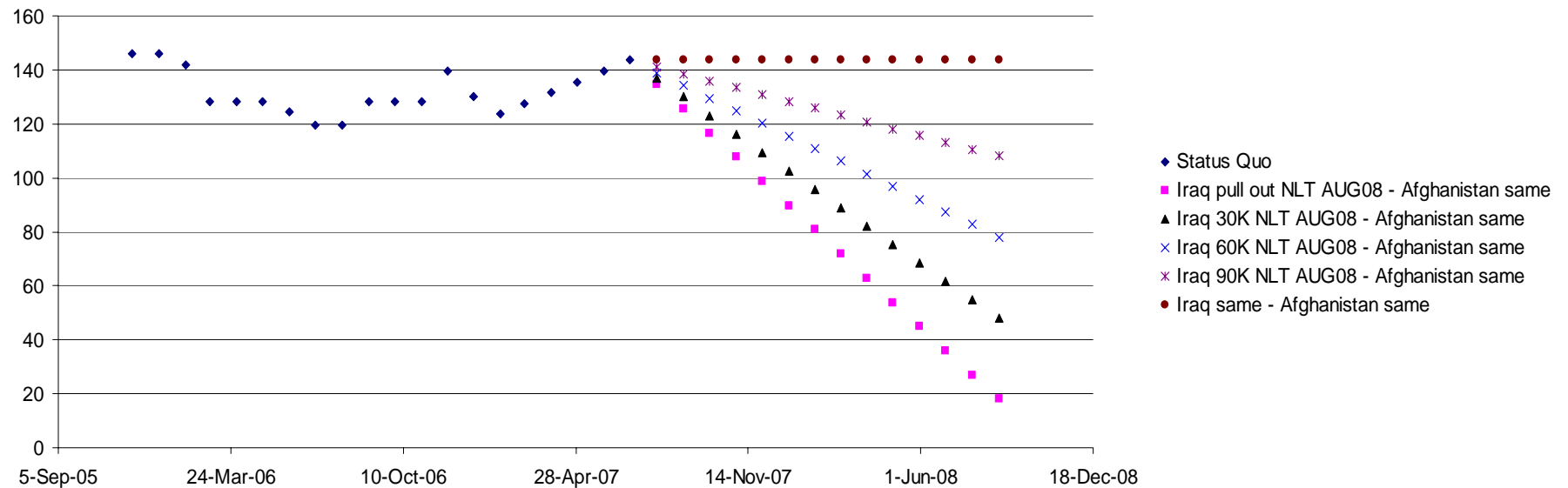
# ARFORGEN



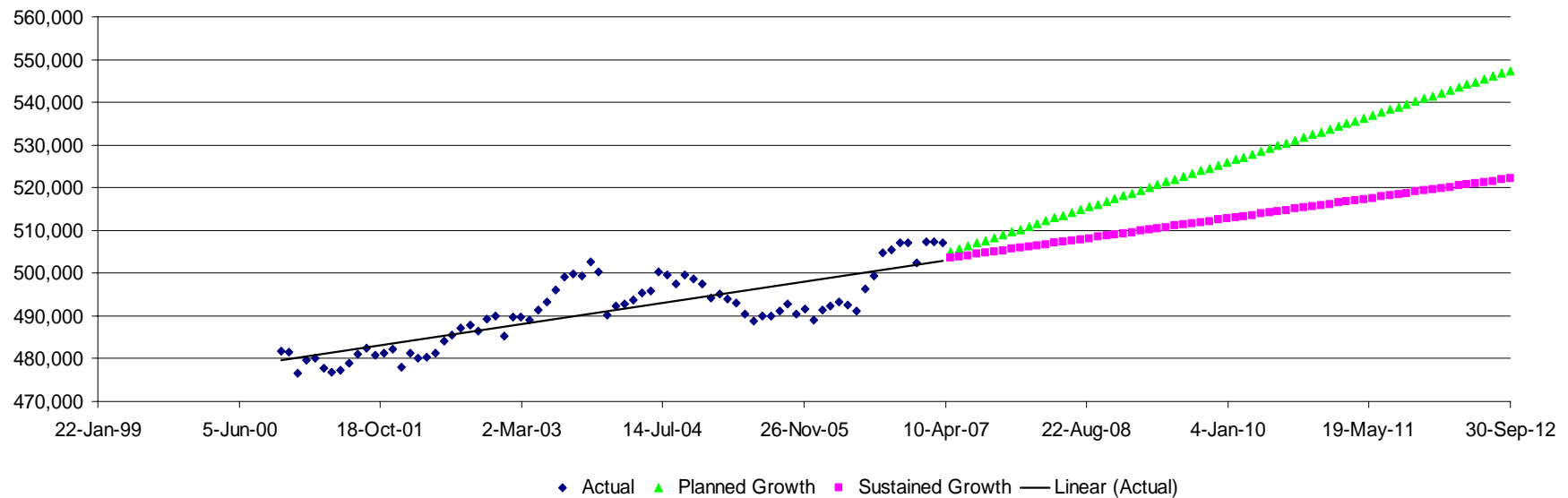
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# Incorporating Future Dynamics of the Army

Deployed Forces (OIF + OEF)

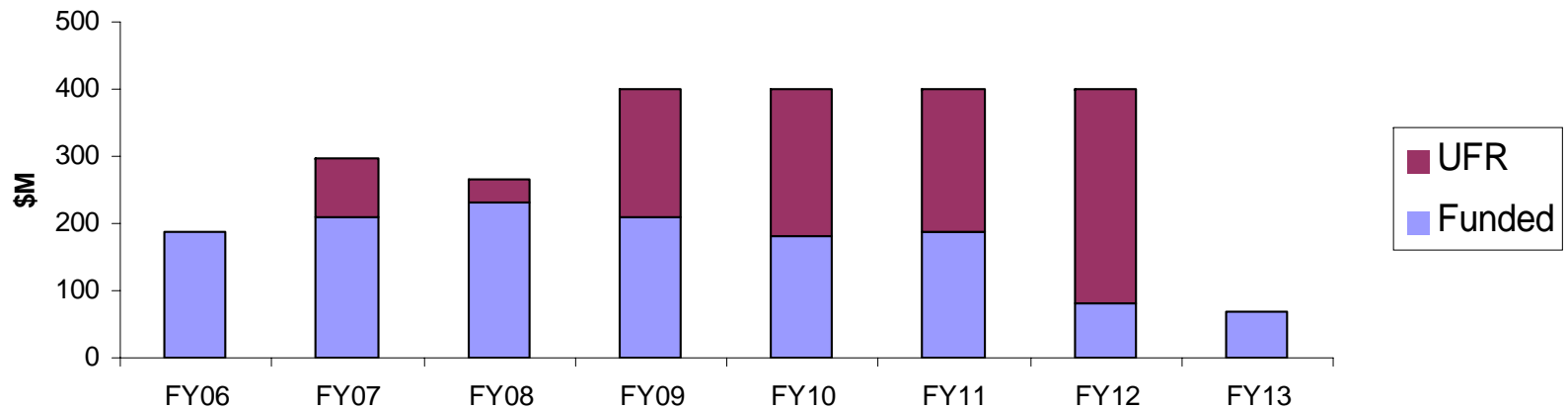


AC End Strength



# UFR Quantification

Thermal Weapon Sights



IBCT	0	7.58	2.25	14.98	16.99	16.47	24.3	0
HBCT	0	8.55	2.54	16.9	19.17	18.58	27.42	0
SBCT	0	5.91	1.76	11.68	13.25	12.84	18.95	0

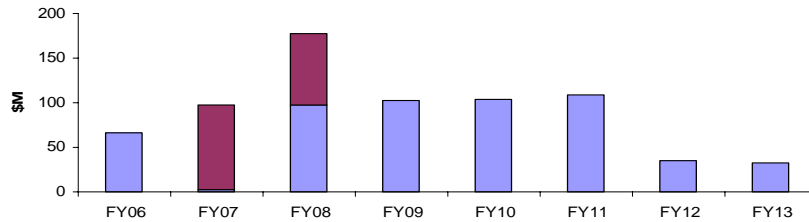
*For each FY, the number associated with each BCT type is a quantification of the UFR.*



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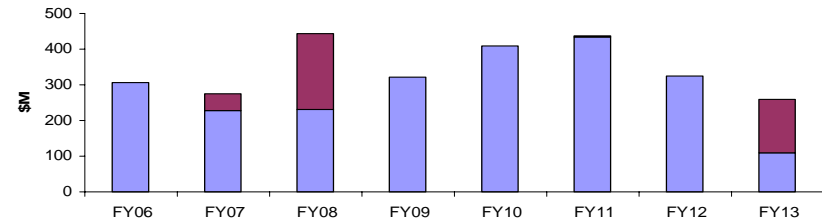
# Targeted Lines

5.56 Carbine M4



IBCT	20.59	15.77	0.00	0.00	0.00	0.00	0.00
HBCT	20.12	15.40	0.00	0.00	0.00	0.00	0.00
SBCT	17.09	13.09	0.00	0.00	0.00	0.00	0.00

Helmet Mtd NVDs



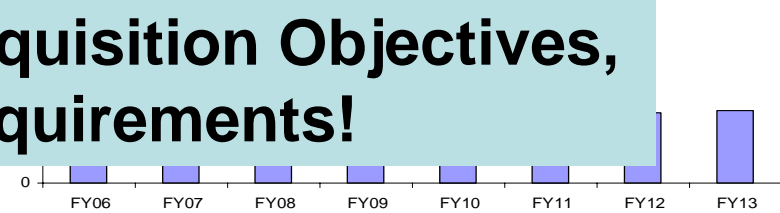
IBCT	3.49	15.71	0.00	0.00	0.05	0.00	4.86
HBCT	3.25	14.61	0.00	0.00	0.04	0.00	4.52
SBCT	3.01	13.54	0.00	0.00	0.04	0.00	4.19

Thermal Weapon Sights



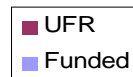
IBCT	7.58	2.25	14.98	16.99	16.47	24.30	0.00
HBCT	8.55	2.54	16.90	19.17	18.58	27.42	0.00
SBCT	5.91	1.76	11.68	13.25	12.84	18.95	0.00

LLDR

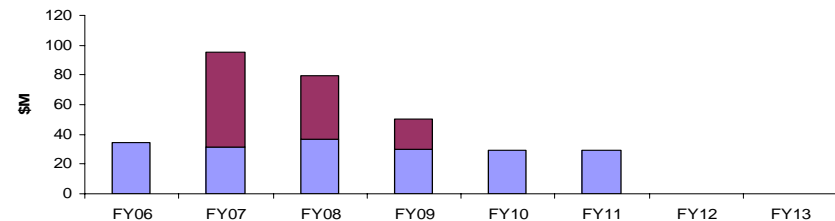


IBCT	9.24	5.78	0.00	0.00	0.00	0.00	0.00
HBCT	7.78	4.87	0.00	0.00	0.00	0.00	0.00
SBCT	17.40	10.88	0.00	0.00	0.00	0.00	0.00

For each FY, the number associated with each BCT type is a quantification of the UFR. For example, for the M240 in FY07, filling that FY UFR would field M240s to 36.93 IBCTs or 45.64 HBCTs or 29.86 SBCTs.



M240



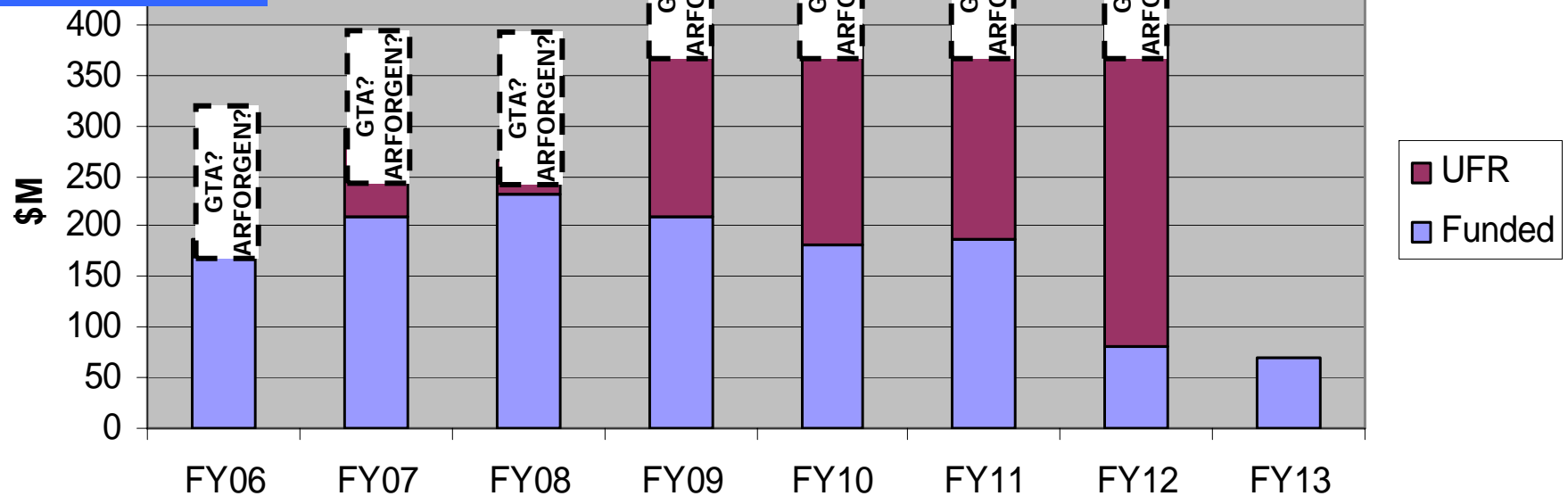
IBCT	36.93	15.36	7.24	0.00	0.00	0.00	0.00
HBCT	45.64	18.98	8.95	0.00	0.00	0.00	0.00
SBCT	29.86	12.42	5.85	0.00	0.00	0.00	0.00

# Budget Line Forecast and Impact Illustration

## *An Example*

Thermal Weapon Sights

Assess Uncertainty:



ID Capability Impact:

10 IBCTs  
or  
9 HBCTs  
or  
6 SBCTs

4 IBCTs  
or  
4 HBCTs  
or  
3 SBCTs

22 IBCTs  
or  
20 HBCTs  
or  
14 SBCTs

24 IBCTs  
or  
22 HBCTs  
or  
16 SBCTs

23 IBCTs  
or  
21 HBCTs  
or  
16 SBCTs

33 IBCTs  
or  
30 HBCTs  
or  
21 SBCTs



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# Future Work

- Build the Capabilities Based Budget Forecasting Model

- Challenges:

- ❑ Significant uncertainties and assumptions
    - ❑ Data collection

- Goal

- ❑ Provide data for the FY10 POM development



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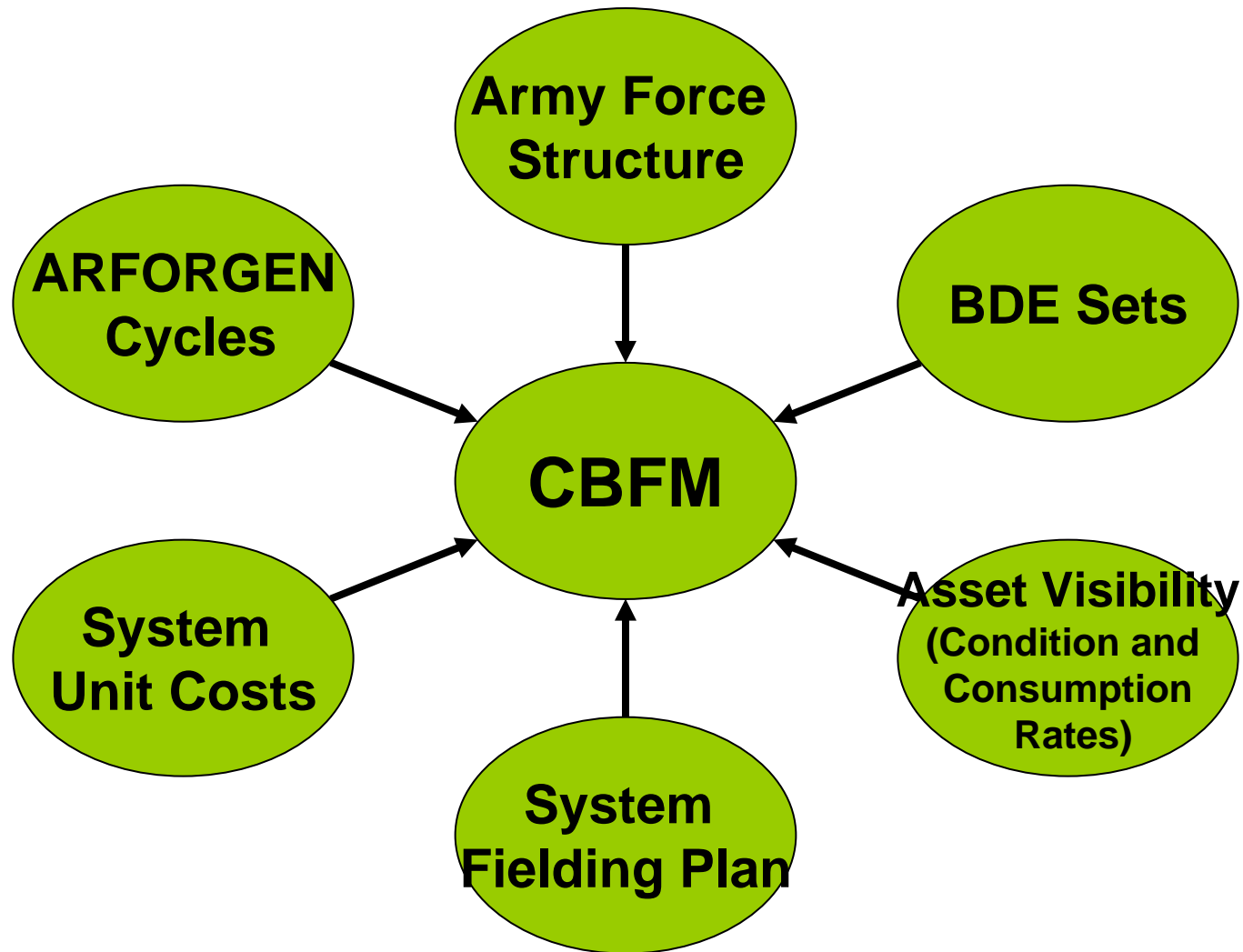
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# Back Up Slides



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# Inputs to the CBFM





## Use of Transformed BCT Force Structure Data to Drive Budget Line Impacts

Tgt d Line	LIN	Name	IBCT	HBCT	SBCT
M240	M92841	MACHINE GUN: 7.62MM M240B	173	140	214
TWS	S60356	SIGHT: THERMAL AN/PAS-13B(V)1	246	110	208
	S90535	SIGHT: THERMAL AN/PAS-13	346	290	431
	S90603	SIGHT: THERMAL AN/PAS-13A	375	457	601
M4	R97234	RIFLE 5 56 MILLIMETER: M4	3072	3145	3701
E-NVDs	M79678	NIGHT VISION DEVICE: AN/PVS-14	487	487	1092
	N05482	NIGHT VISION GOGGLE: AN/PVS-7B	2646	2881	2542
LLDR	R60282	LLDR: LASER AN/PED-1	32	38	17



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# The Environment

## Facts

- Soldiers will continue to require modern solutions to meet survivability, lethality, and information needs.
- The Department of the Army will annually consider a budget that seeks to meet Soldier needs.

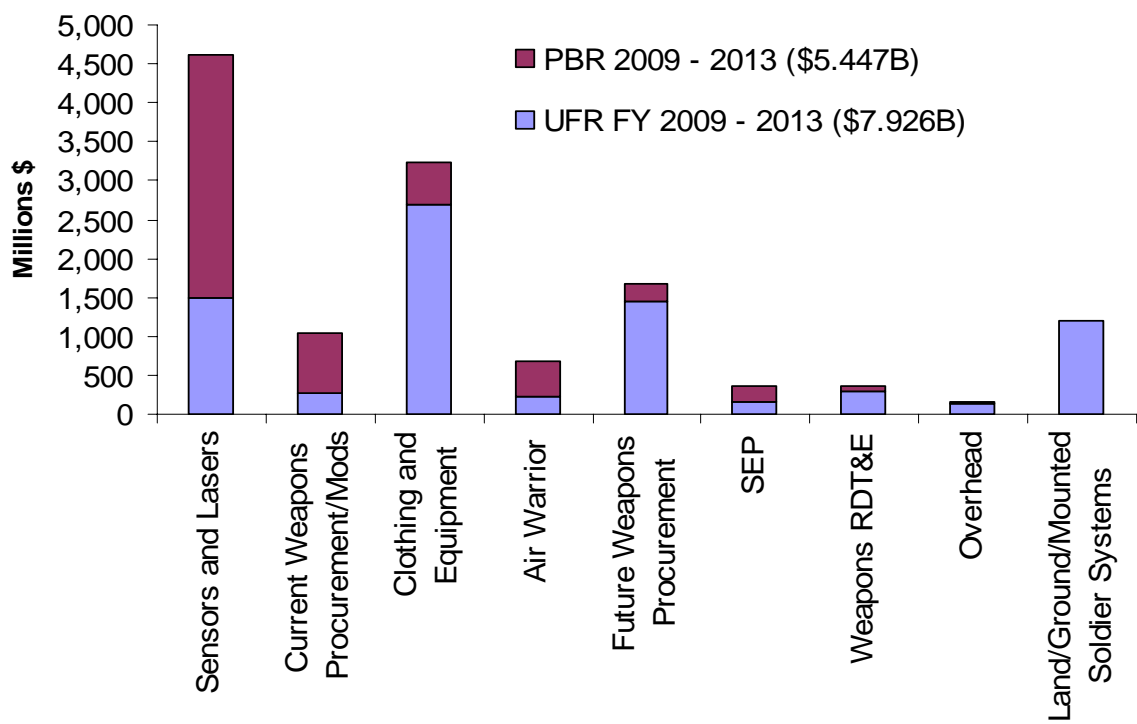
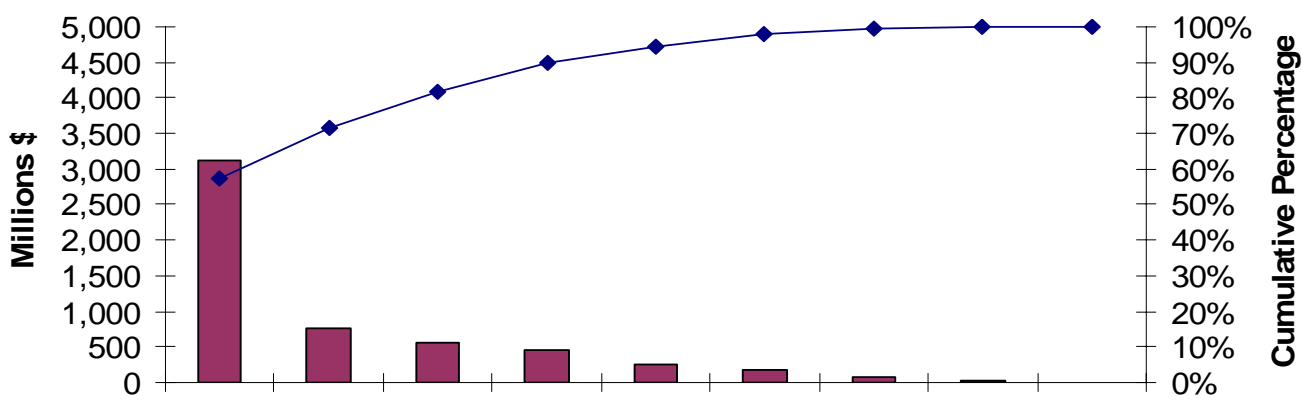
## Assumptions

- The Army will transform IAW the Army Campaign Plan
- The Army will grow to an authorization of 547,000 soldiers
- The Army will continue to deploy modular brigades in combat environments (at least through FY09-15)
- The Army will implement the AFORGEN synchronization plan and provide AC BCTs with dwell time of 10 mos to three years (1:3, 1 unit deployed for every 3 at home station) and ARNG dwell time of 3 to 6 years (1:6)

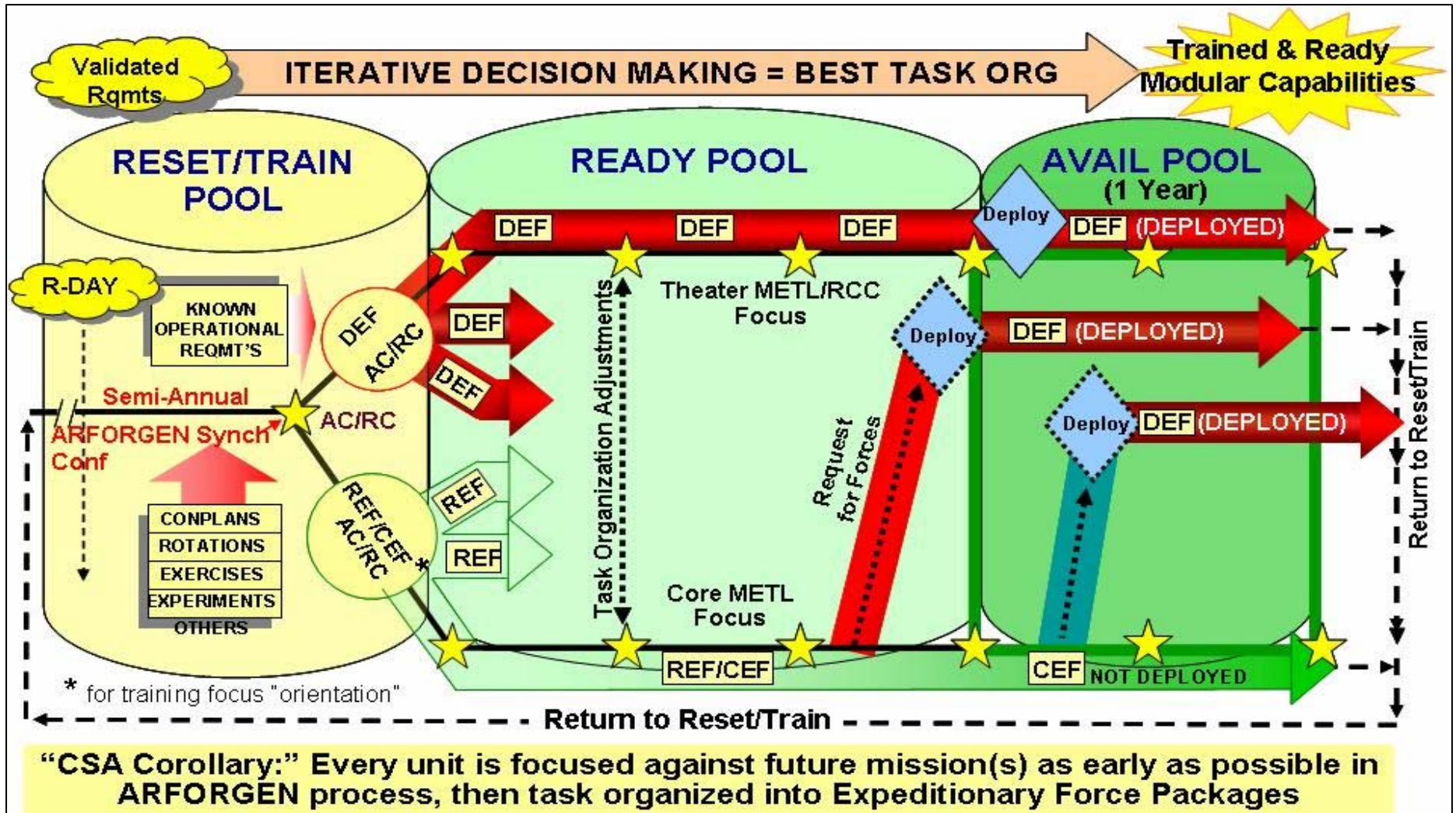


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# ARFORGEN



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